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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/912,589

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David P. Bour

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03/10/2003

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EXAMINER

LOUIE, WAI SING

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 03/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/912,589

Applicant(s)

BOUR ET AL.

Examiner

Wai-Sing Louie

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 9-17 and 25-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-17 and 25-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9-10, 12-17, 25-26, and 28-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ibbetson et al. (US 6,515,313), newly cited.

With regard to claims 9 and 17, Ibbetson et al. disclose a method of forming a high efficiency light emitter (col. 6, line 11 to col. 13, line 16 and fig. 10A) comprising:

- Forming a first semiconductor layer 111 of a first conductivity type and having a first surface;
- Forming an active region 113 over the first semiconductor layer 111. Ibbetson et al. disclose the active region could be a quantum well (col. 10, lines 49-56 and fig. 7A). The active region including a second semiconductor layer 91 formed directly on the first semiconductor layer 111. The second semiconductor layer 91 is one of the layer in a quantum well 90 and a barrier layer 92. The second semiconductor layer 91 formed from an III-nitride semiconductor alloy (col. 10, line 60). Ibbetson et al. disclose the active region could be a graded semiconductor compound (col. 9, line 66 to col. 10, line 45) having a composition

graded in a direction substantially perpendicular to the first surface of the first semiconductor layer 111 (col. 10, lines 18-27);

- Forming a third semiconductor layer 114 of a second conductivity type over the active region 113.

With regard to claims 10 and 26, the second semiconductor layer in a wurtzite crystal structure (col. 2, line 2).

With regard to claims 12 and 28, Ibbetson et al. disclose a graded composition of the III-nitride semiconductor alloy active layer to reduce the effect of a piezoelectric field in the active region (col. 5, lines 12-18).

With regard to claims 13, 15, and 29, Ibbetson et al. disclose grading an indium mole fraction of the III-nitride semiconductor alloy linearly (col. 10, lines 18-29).

With regard to claims 14 and 30, Ibbetson et al. disclose an III-nitride semiconductor alloy is  $\text{Al}_y\text{In}_x\text{Ga}_{1-x-y}\text{N}$  with  $0 \leq x \leq 1$ ,  $0 \leq y \leq 1$ , and  $x+y \leq 1$  (col. 8, line 18).

With regard to claim 16, Ibbetson et al. disclose grading an aluminum mole fraction of the III-nitride semiconductor alloy (col. 9, lines 22-31).

With regard to claims 25 and 31, in addition to the limitations disclosed in claim 9 above, Ibbetson et al. also disclose:

- The active region includes a plurality of barrier layer 92, which is formed from an III-nitride semiconductor alloy having an indium mole fraction graded in a direction substantially perpendicular to the first surface of the first semiconductor layer 111 (col. 7, line 46 to col. 10, line 23).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ibbetson et al. (US 6,515,313) in view of Yano et al. (US 6,045,626), previously used.

With regard to claims 11 and 27, Ibbetson et al. disclose a graded composition of the III-nitride semiconductor alloy active layer, but do not disclose the structure is asymmetrical. However, the asymmetrical structure is well known in the art such as disclosed in Yano et al. (fig. 3). Therefore, it would have been obvious to modify Ibbetson's device to have an asymmetrical structure like Yano et al.

***Response to Arguments***

Applicant's arguments with respect to claims 9-17 and 25-31 have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474.

The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

wsl  
March 4, 2003

  
LONG PHAM  
PRIMARY EXAMINER